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ABSTRACT

Stability of temperament over successive ages in the first 2 years was evaluated for 109 full-term and 81 preterm infants who were assessed at 6, 9, 12, 18, and 24 months of age. At each age subjects were engaged in a series of age-appropriate vignettes in the laboratory; experimenters used a structured sequence of activities. Composite ratings were made of emotional tone, attentiveness, activity, and orientation to staff. Correlations computed over ages indicated, for full term infants, significant stability across ages. Significant stability was also demonstrated for two separate measures of period-to-period variability at each age: for emotional tone-variability, beginning at 6 to 9 months; for activity-variability, beginning at 12 to 18 months. The same pattern of stability was not observed for the preterm infants. Stability across ages generally was not observed until the later months of infancy or toddlerhood. Occasionally stability was sporadic, and occasionally it was not observed by 18 to 24 months. Findings indicated that, for full-term infants, stable aspects of temperament were apparent during the first yerr of life. In contrast, individual differences were not as clearly defined for preterm infants until later infancy or toddlerhood. Results suggested that prematurity depresses longitudinal stability of temperament during the first year of life. (Author/RH)

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Temperament Stability Across the First Two Years in Full-term and Preterm Infants

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Abstract

Temperament stability over successive ages in the first two years was evaluated for 109 full-term and 81 preterm infants who were assessed at 6, 9, 12, 18, and 24 months. At each age the infant was engaged in a series of age-appropriate vignettes in the laboratory, using a structured sequence of activities. Composite ratings were made of emotional tone, attentiveness, activity, and orientation to staff. Correlations computed over ages indicated that, for full-term infants, there was significant stability across ages (6 to 9 months, 9 to 12 months, 12 to 18 months, and 18 to 24 months) for all variables (*r*'s range from .20 to .63). Significant stability was also demonstrated for two separate measures of period-to-period variability at each age: for emotional tone-variability, beginning at 6 to 9 months; for activity-variability, beginning at 12 to 18 months. The same pattern of stability was not observed for the preterm infants - stability across ages generally was not observed until later ages of infancy or toddlerhood, occasionally was sporadic, and occasionally was not observed by 18 to 24 months. The findings indicated that, for full-term infants, stable aspects of temperament were apparent during the first year of life. In contrast, individual differences were not as clearly defined for preterm infants until later infancy or toddlerhood. The results suggested that prematurity depresses longitudinal stability of temperament during the first year.

It has been well documented in recent years that preterm infants are at risk for developmental disabilities (Caputo, Goldstein, & Taub, 1979; Caputo & Mandel, 1970; Holmes, Reich, & Pasternak, 1984; Lubchenco, 1976; Saint-Anne Dargassies, 1966). Although similarities in behavioral and neurophysiological performance have been demonstrated between full-term and preterm infants tested at 40 weeks conceptional age, differences also have been described (Aylward, 1982; Koops & Harmon, 1980; Palmer, Dubowitz, Verghote, & Dubowitz, 1982; Parmelee, 1975; Saint-Anne Dargassies, 1966).

The effects of these initial differences between full-term and preterm infants typically have been considered in terms of the developmental integrity of the infant, such as mental or motor development. More recently, an additional area of behavior, temperament, has received much attention (Buss & Plomin, 1984; Goldsmith & Campos, 1982; Hubert, Wachs, Peters-Martin, & Gandour, 1982; Rothbart & Derryberry, 1981), with some focus on problems of continuity of temperament from one age to the next. Several researchers propose a constitutional basis for temperament reflecting genetic and prenatal effects (Buss & Plomin, 1984; Rothbart & Derryberry, 1981). A comparison of temperament stability in full-term and preterm infants could address the issue of constitutional influences on temperament development, and determine if this is an additional area of risk to be considered in the evaluation of the preterm infant.

Using a standardized laboratory assessment, previous research (Matheny, Wilson, & Nuss, 1984; Wilson & Matheny, 1986)

demonstrated significant longitudinal stabilities in temperament over ages from 9 to 12 months, 12 to 18 months, and 18 to 24 months. Longitudinal stabilities were demonstrated across ages from 12 to 24 months using factor scores derived from composite ratings of emotional tone, activity, attentiveness, and sociability (Matheny et al,. 1984). Extending the age period back to 9 months, Wilson and Matheny (1986) demonstrated longitudinal stability for the individual composite scores over ages from 9 to 24 months, with an increase in correlations observed between 18 and 24 months.

Because the preterm infant is at risk for developmental disabilities in several areas of behavior, it is of interest to compare longitudinal relations for temperament variables between full-term and preterm infants to determine if prematurity might affect the predictive relations. For this purpose, this study used a laboratory procedure specifically designed to provide all infants with the same sequence of events, and to have their behavior rated by trained observers on several categories of temperament. The behavioral ratings were aggregated into composite scores at each age to describe the infant's behavior across the standardized procedures. The study was designed to compare temperament stability in full-term and preterm infants over successive ages at 6, 9, 12, 18, and 24 months. At each age the infant was engaged in a series of age-appropriate vignettes in the laboratory, using a structured sequence of play activities and interactions, during which ratings were made of emotional tone, activity, attentiveness, and social orientation to staff.

Method

Subjects. The infants were recruited as part of an ongoing longitudinal study of twins. At the time of this study varying numbers of infants had completed laboratory visits at the successive ages as follows -- 6 months: 109 full-term (56 male, 53 female), 81 preterm (43 male, 38 female); 9 months: 99 full-term (50 male, 49 female), 75 preterm (37 male, 38 female); 12 months: 95 full-term (48 male, 47 female), 74 preterm (38 male, 36 female); 18 months: 87 full-term (44 male, 43 female), 69 preterm (38 male, 31 female); 24 months: 81 full-term (40 male, 41 female), 63 preterm (33 male, 30 female).

Procedure. The infants were seen in the laboratory at 6, 9, 12, 18, and 24 months of age. At each age a standardized sequence of play activities and interactions (or vignettes) were presented to the infant, although the vignettes were modified to be appropriate for each age. The sessions were videotaped according to a pre-set schedule, and the ratings of temperament were made from the videotape.

For illustration, one vignette employed at each age is briefly described below. Some of the vignettes bridge consecutive ages. The complete set may be found in Matheny and Wilson (1981).

6 months: Cradle gym. The infant was lying in a supine position on a mat on the floor. A cradle gym, suspended between two uprights, was positioned over the infant and at a height that allowed the infant to touch red rings dangling from the apparatus. If the infant did not attend to the cradle gym, the entire

apparatus was jiggled intermittently until the infant showed some regard.

9 months: Drum. A plastic drum and drumstick were set before the infant, and E banged upon the drum with the drumstick. The drumstick was given to the infant and E encouraged the infant to bang.

12 months: Visible Barrier. The infant was seated at a low table and given an attractive small toy. When the infant held the toy and proceeded to play with it, the toy was taken from the infant and moved away from, but within reach of, the infant. As the infant reached for the toy, a transparent plexiglass screen was placed upright between the infant and the toy. If the infant did not attempt to obtain the toy, the screen was removed and the same or another toy was given to the infant.

18 months: Puppet. Behind E's back, E put on a hand puppet and, after gaining the infant's attention, revealed the puppet. E described the puppet, then initiated interaction between the infant and puppet. If the infant was willing, E encouraged the infant to work the puppet.

24 months: Mechanical toy. A battery-powered dog that barks and moves was placed in front of the infant. The controlling mechanism, connected to the dog by a long wire, was held by E who activated the dog and showed the infant how the toy works. The infant was offered the control and encouraged to make the dog bark and move.

After the visit was completed, the infant's behavior was rated by a trained observer for each successive 2-minute episode

on the videotape. No rater scored the episodes for which she was the principal interactionist with the infant. The following behaviors were rated on 9-point scales.

1. Emotional tone: Refers to the principal emotional state exhibited during the rating period, ranging from extreme distress to animated laughter.
2. Attentiveness: Refers to the degree to which an infant was alert to and maintained attention toward objects and events.
3. Activity. Refers to body motion with or without locomotion; may involve whole or partial body movements.
4. Social orientation to staff: Refers to the positive and negative aspects of social orientation of the infant in relation to others.

Interrater reliabilities, based on 15 infants whose videotapes were completely rescored by separate examiners, were determined by intraclass correlations. They were: Emotional tone, $\underline{r} = 0.91$; attentiveness, $\underline{r} = 0.91$; activity, $\underline{r} = 0.89$, and social orientation to staff, $\underline{r} = 0.72$.

The scoring was designed so that higher ratings on these scales indicated (a) for emotional tone, more positive mood; (b) for attentiveness, more focused or sustained attention; (c) for activity, a higher level of activity; and (d) for social orientation to staff, a more positive and approachful manner. The ratings were summed across all 2-minute periods into one composite score for each rating scale. In addition, measures of

period-to-period change in emotional tone and activity were obtained (emotional tone-variability and activity-variability).

Results

To determine if there were consistent individual differences in the laboratory variables over ages from 6 months to 24 months, correlations were computed across ages separately for the full-term and preterm infants. The correlations are presented in Table 1. For the full-term infants there was significant stability across all ages (6 to 9 months, 9 to 12 months, 12 to 18 months, and 18 to 24 months) for all temperament variables, with the one exception of social orientation to staff between 18 and 24 months. Examination of the range of scores at each age for this variable indicated that both the lower and upper points had a relatively large decrease from 18 to 24 months, suggesting that at this age the infants had become markedly more negative toward, and more avoidant of, the staff. At 24 months the infants played with the toys by themselves more frequently than at the earlier ages, and increased language skills enabled them to express their negative attitudes.

Insert Table 1 about here

In general, individual differences in stability were displayed from 6 months on, and the age-to-age stabilities showed an increase in the correlations with increasing age for emotional tone, attentiveness, and social orientation to staff. The age-to-age correlations started relatively higher at the 6- to 9-

month period for activity than for the other variables, and remained moderately high across age periods. In sum, individual differences in temperament were observed across age periods, with an increase in the relations over ages.

The separate measures of period-to-period variability at each age demonstrated significant stability for emotional tone-variability beginning at 6 to 9 months, although stability was not maintained between 9 and 12 months, but was observed again from 12 to 18 months and 18 to 24 months. Significant stability for activity-variability was not demonstrated until 12 to 18 months, but was maintained between 18 and 24 months. Thus, variability of behavior (i.e., whether the infant was consistent in ratings received for emotional tone and activity over successive periods) did not show the same degree of stability over ages as was observed for the temperament variables, although some stability clearly was maintained over ages during the first two years.

The same pattern of temperament stability over ages was not observed for the preterm infants. Between 6 and 9 months a significant relation was observed for one variable only -- social orientation to staff. This stability was maintained across two later age periods, but not between 12 and 18 months. For emotional tone, stability across ages was first observed between 9 and 12 months, and remained consistent across ages from that point. For attentiveness, stability across ages was not observed until 12 to 18 months, and then was maintained between 18 and 24 months with a substantial increase in the correlation size. For

activity, sporadic stability was observed; that is, between 9 and 12 months, and between 18 and 24 months. For the separate measures of variability at each age, stability over ages was first observed for activity-variability between 12 and 18 months. No age-to-age stability was observed for emotional tone-variability for the preterm group.

Thus, for the preterm infants, age-to-age stability was not observed as early, or as consistently, as for the full-term infants. In two temperament dimensions, emotional tone and attentiveness, longitudinal stability was maintained across ages once observed. Prematurity appears to depress longitudinal stability during early development, but with increasing age some temperament patterns become more stable.

Discussion

It is clear that the stability of the ordering of individual differences across the first two years of life was different for full-term and preterm infants. Individual differences over ages were observed for each of the temperament variables for the full-term infants beginning at 6 months, but for the preterm infants individual differences over ages either were not observed until later infancy, were sporadic in nature, or occasionally were not observed by 18 to 24 months. The findings for the full-term infants confirmed the previous results which demonstrated stability over ages in temperament variables (Wilson & Matheny, 1986), and extended those findings back to 6 months of age. Similarly, there was a general trend toward an increase in the

correlations with increasing age, indicating that individual differences became more consolidated over time.

Differences in rates of maturation within the preterm group may account for the observed differences in longitudinal stability between full-term and preterm infants. If temperament is influenced by constitutional factors (Buss & Plomin, 1984; Rothbart & Derryberry, 1981), and constitutional factors are influenced by maturation and experience (Rothbart & Derryberry, 1981), then maturational phases influence the degree of continuity of temperament in the first two years of life. Rates of maturation may affect the way the infant experiences events in the environment so that, during early development at least, maturation and experience interact to influence temperament stability. In any event, it is clear that, while it is possible to make some predictions about early temperament for full-term infants, it is more difficult to predict for preterm infants.

It was demonstrated, however, that, for all laboratory variables, the preterm infants showed stability in ratings from 18 to 24 months. It may be that by this age period the preterm infants have caught up sufficiently in development to maintain the ordering of individual differences. Or, it may be demonstrated that these findings, too, are sporadic, and that the preterm infants must undergo some further maturational changes to maintain temperament stability across ages. Assessment of these infants later in development can address this issue.

References

Aylward, G. P. (1982). Forty-week full-term and preterm neurologic differences. In L. P. Lipsitt, & T. M. Field (Eds.), Infant behavior and development: Perinatal risk and newborn behavior. Norwood, NJ: Ablex Publishing Corp.

Buss, A. H., & Plomin, R. (1984). Temperament: Early developing personality traits. Hillsdale, NJ: Erlbaum.

Caputo, D. V., Goldstein, K. M., & Taub, H. B. (1979). The development of prematurely born children through middle childhood. In T. M. Field, A. M. Sostek, S. Goldberg, H. H. Shuman (Eds.), Infants born at risk: Behavior and development (pp. 219-247). New York: Spectrum Publications.

Caputo, D. V., & Mandell, W. (1970). Consequences of low birth weight. Developmental Psychology, 3, 363-383.

Goldsmith, H. H., & Campos, J. J. (1982). Toward a theory of infant temperament. In R. N. Emde, & R. J. Harmon (Eds.). The development of attachment and affiliative systems. New York: Plenum.

Holmes, D. L., Reich, J. N., & Pasternak, J. F. (1984). The development of infants born at risk. Hillsdale, NJ: Lawrence Erlbaum Associates.

Hubert, N. C., Wachs, T. D., Peters-Martin, P., & Gandour, M. J. (1982). The study of early temperament: Measurement and conceptual issues. Child Development, 53, 571-600.

Koops, B. L,. & Harmon, R. J. (1980). Studies on long-term outcome in newborns with birth weights under 1500 grams. Advances in Behavioral Pediatrics, 1, 1-28.

Lubchenco, L. O. (1976). The high risk infant. Philadelphia: W. B. Saunders.

Matheny, A. P., Jr., Wilson, R. S., & Nuss, S. M. (1984). Toddler temperament: Stability across settings and over ages. Child Development, 55, 1200-1211.

Palmer, P. G., Dubowitz, L. M. S., Verghote, M., & Dubowitz, V. (1982). Neurological and neurobehavioral differences between preterm infants at term and full-term newborn infants. Neuropediatrics, 13, 183-189.

Parmelee, A. H. (1975). Neurophysiological and behavioral organization of premature infants in the first months of life. Biological Psychiatry, 10, 501-512.

Rothbart, M. K., & Derryberry, D. (1981). Development of individual differences in temperament. In M. E. Lamb, & A. L. Brown (Eds.), Advances in developmental psychology: Vol. I. Hillsdale, NJ: Lawrence Erlbaum Associates.

Saint-Anne Dargassies, S. (1966). Neurological maturation of the premature infant of 28 to 41 weeks' gestational age. In F. Falkner (Ed.), Human development. Philadelphia: Saunders.

Wilson, R. S., & Matheny, A. P., Jr. (1986). Behavior-genetics research in infant temperament: The Louisville Twin Study. In R. Plomin, & J. Dunn (Eds.), The study of tgemperament: Changes, continuities, and challenges (pp.81-97). Hillsdale, NJ: Erlbaum.

Table 1

Age-to-Age Correlations for Temperament Ratings for Full-term and Preterm Infants

Full-term Variable	Ages 6 to 9 Months	9 to 12 Months	12 to 18 Months	18 to 24 Months
Emotional tone	.29**	.38**	.44**	.54**
Emotional tone-Var	.31**	---	.41**	.45**
Activity	.48**	.43**	.63**	.49**
Activity-Var	---	---	.27*	.47**
Attentiveness	.20*	.24*	.40**	.54**
Social Orientation	.27**	.35**	.45**	---

Preterm Variable	6 to 9 Months	9 to 12 Months	12 to 18 Months	18 to 24 Months
Emotional tone	---	.47**	.42**	.56**
Emotional tone-Var	---	---	---	---
Activity	---	.31*	---	.45**
Activity-Var	---	---	.28*	.28*
Attentiveness	---	---	.37**	.62**
Social Orientation	.38**	.50**	---	.47**

* $p < .05$, ** $p < .01$